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COLBERT LANDFILL RD/RA
AIR MONITORING/MODELLING
TECHNICAL MEETING AGENDA

Air Modelling

- Project Requirements
- Screening Model
- Refined Model

Air Monitoring Scope

- Air Quality Data Collection
- Meteorologic Data Collection

Correlation of Onsite and NWS Meteorologic Data

- Spatial Dependence
- Statistical Correlation

Onsite Meteorological Station Upgrade

- Instrumentation
- Location/Height
- Data Collection
- Data Reduction
- Quality Assurance

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COLBERT LANDFILL RD/RA
AIR MONITORING/MODELING

OCTOBER 1, 1990 TECHNICAL MEETING
SUMMARY OF KEY POINTS

1) AIR MODELLING

- **Project Requirements:** Section V.D. of the Colbert Landfill Consent Decree Scope of Work (SOW) specifies that the need for air stripping tower off-gas abatement during Phase II will be evaluated based on lifetime cancer risk (for carcinogenic compounds) and hazard indices (for noncarcinogenic compounds). Off-gas treatment will not be required if increased carcinogenic risk and hazard indices are below 10^{-6} and 1, respectively. Preliminary air modelling (accomplished during negotiation of the SOW) using a simple (hand calculated) Gaussian model, estimated lifetime cancer risk and hazard indices to be 3.5×10^{-7} and 1.4×10^{-4}, respectively, based on the following (assumed) average conditions:
  - 40 foot tower height
  - 500 and 1,000 foot receptor distances
  - 15 mph average wind speed
  - Down-wind, wind direction (worst case) 25 percent of time
  - Average emission mass flux of contaminants based on total mass distributed over 70 year timeframe.

  The SOW specifies that additional air modelling be accomplished based on additional data collected during Phase I and Phase II.

- **Screening Model:** EPA guidance (EPA-450/4-88-010) suggests a three phase approach for air quality analysis:
  - Phase 1: Simple screening procedure (screening modelling)
  - Phase 2: Detail screening procedure (basic modelling, if needed)
  - Phase 3: Refined analysis (refined modelling, if needed).

  The health risk assessment requires evaluation of exposure over a 75 year period and the project life (assumed to be 30 years) for carcinogenic risk and hazard indices, respectively. These time spans preclude the use of screening modelling (Phase 1). However, annual average and maximum annual average concentrations calculated using basic modelling (Phase 2) procedures, or equivalent procedures, are appropriate for evaluating health risk.

  It is anticipated that the Industrial Source Complex (ISC) model and NWS meteorologic data will be used for basic modelling.

- **Refined Model:** A refined model will be developed if the results of the basic model indicate a significant health risk may exist, or NWS meteorological data is determined to be inappropriate for the site. It is anticipated that the ISC model, and similar modelling procedures (as used for the basic model), would be used for the refined model. The primary difference between the basic and refined models would be the use of onsite rather than NWS meteorological data.

2) AIR MONITORING SCOPE

The Consent Decree Scope of Work (SOW) specifies: "air monitoring and modeling will be conducted during Phase I to confirm wind speed and wind direction, and the applicability of the Gaussian model." Based on this language, an air monitoring scope was developed for Phase I that included onsite meteorologic data collection for wind speed and wind direction, and a limited air quality sampling program. Based on discussions with EPA and Ecology, a more appropriate Phase I air monitoring scope would include:

- An upgrade of the onsite meteorologic station to collect wind speed, wind direction, and temperature measurements in accordance with applicable EPA guidance documents (if NWS data are not representative of site conditions).
- Elimination of air quality monitoring (based on EPA guidance for air dispersion modeling, ambient air quality monitoring data will not be used to assess model performance).

3) CORRELATION OF ONSITE AND NWS METEOROLOGIC DATA

- **Spatial Dependence:** The Spokane NWS station is about 20 miles SSW of the Colbert Landfill. There is about a 300-foot elevation difference between the two sites (the NWS station is higher) and nearby topography is relatively flat at both locations. Regional topographic features (mountains, valleys, etc.) may cause significant differences in meteorologic conditions at the two sites under certain atmospheric conditions, although "average" meteorologic conditions may be similar.
- **Statistical Correlation:** Wind speed and wind direction data for the two sites will be correlated using wind roses. A wind rose will be prepared for the site using the preliminary meteorologic data collected since March 1990; although these data do not meet EPA guidance, they are comparable to NWS data for wind speed and wind direction. The distribution of wind speed and wind direction for the two sites will then be compared, and a qualitative assessment of the degree of correlation between the two sites made. This assessment will be made in conjunction with appropriate EPA and Ecology personnel.

4) ONSITE METEOROLOGICAL STATION UPGRADE (IF NEEDED)

- **Instrumentation:** Existing analog instruments onsite for wind speed, wind direction, and temperature will be upgraded. The instruments will meet applicable EPA guidance for accuracy, resolution, and response (see attached Table 1).

- **Location:** The meteorological station will be located as shown on the attached Site Plan. Foundation requirements preclude locating the station directly on the landfill. Therefore, the station will be located on (regraded) existing mounded fill. The location was selected to:

  - minimize turbulence from vegetative and topographic conditions
  - meet tower foundation requirements
  - be in close proximity to the emission source
  - be near a power source.

- **Height:** Data collection height for wind speed and wind direction will be at the anticipated stack elevation (about 55 feet above ground surface). The temperature sensor will be mounted 2 meters above the tower base.

- **Data Collection:** Data will be recorded using an automated digital data acquisition system (data logger). Sampling intervals will be consistent with applicable EPA guidance for calculation of the standard deviation of wind direction (Sigma Theta), and hourly mean wind speed, wind direction and temperature.

- **Data Processing:** Mean values for wind speed, wind direction, and temperature will be calculated by the data logger, as will 15-minute Sigma Theta values. Following data retrieval, hourly Sigma Theta values will be calculated from the 15-minute values. Mean values will be recorded as either 15 minute or hourly values by the data logger; if 15-minute values are recorded, hourly values will be calculated following data retrieval. Pasquill stability categories will be calculated based on Sigma Theta and mean wind speed subsequent to data retrieval.

- **Quality Assurance:** Quality assurance (QA) will be in general accordance with applicable EPA guidance (EPA-450/4-87-013). A QA plan will be prepared in the form of a technical memorandum and submitted to EPA and Ecology for review. The QA plan will address:

  - instrument calibration
  - data validation
  - audits
  - preventative maintenance.

TABLE 1
SPECIFICATIONS FOR METEOROLOGICAL SENSORS

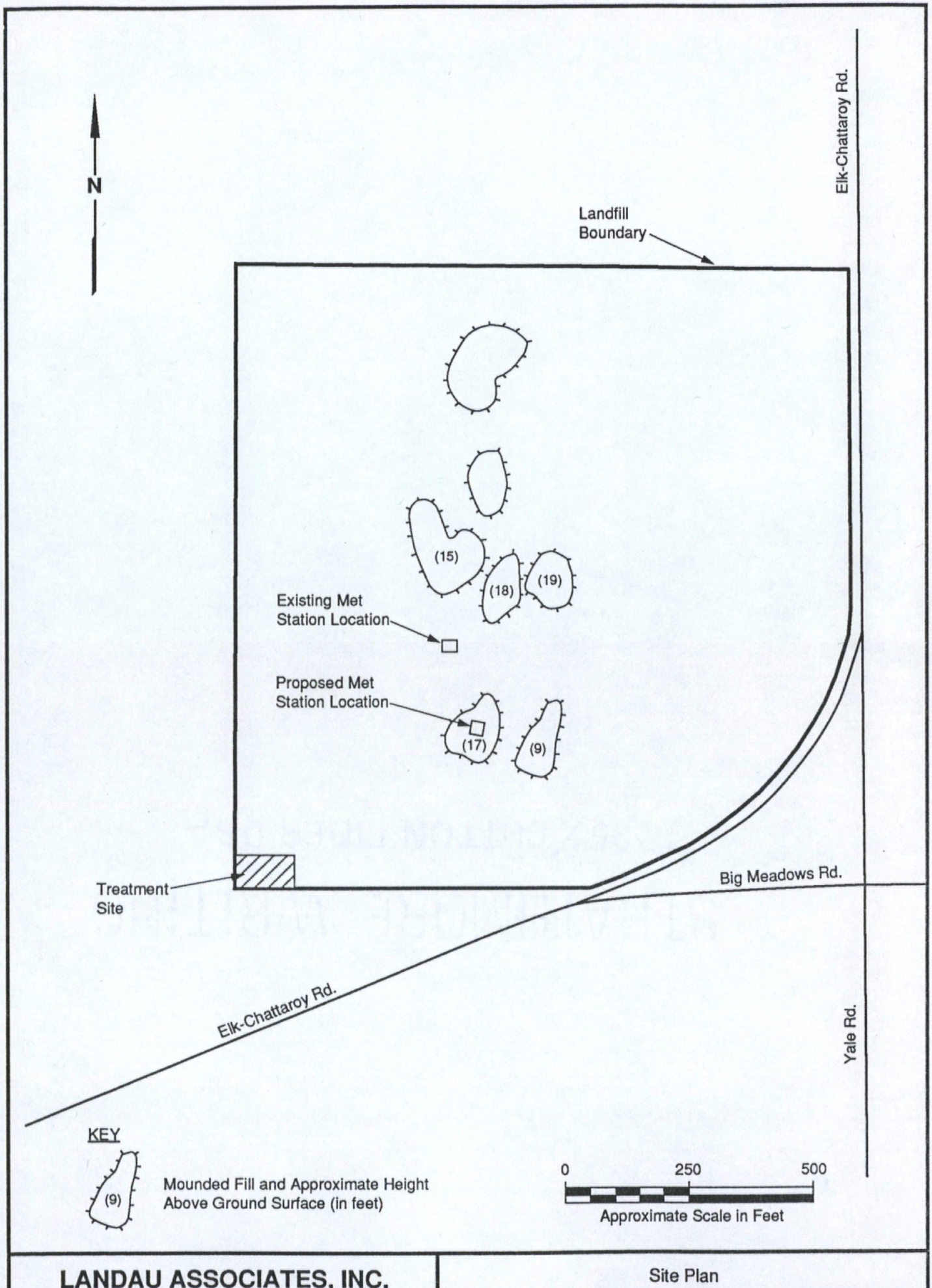
Accuracy & Resolution:

Variable	EPA Recommended Values (1) System Accuracy	Measurment Resolution	Model Installed at Colbert System Accuracy	Measurment Resolution	Model Proposed for Colbert System Accuracy	Measurment Resolution
			DataLynx Wind Sensor #220-100		DataLynx Wind Sensor #220-101	
Wind Speed (2) (Horizontal & Vertical)	+/- (0.2 m/s + 5% of observed)	0.1 m/s	+/- 0.15% to 15 mph (0.01 m/s @ 15 mph) over 15 mph: +/- 1% (0.1 m/s @ 22 mph)	0.06 m/s	+/- 0.1% to 15 mph	0.04 m/s
Wind Direction (azimuth & elevation)	+/- 5 degrees	1 degree	+/- 5 degrees	0.7 degrees	+/- 5 degrees	0.7 degrees
			DataLynx Temp. Sensor #230-201			
Ambient Temperature	+/- 0.5 degrees C	0.1 degree C	+/- 0.4 degrees C	0.1 degrees C	Existing Sensor with the addition of mechanically aspirated shield	
			DataLynx Snow/Rain Gauge #220-100			
Precipitation (3)	+/- 10% of Observed	0.3 mm	+/- 1% for 0-3 in/hr +/- 3% for 3-6 in/hr	0.01 mm	Existing Sensor	
			DataLynx Barometer #230-700			
Pressure (3)	+/- 3 mb	0.5 mb	+/- 1 mb	0.4 mb	Existing Sensor	

Response Characteristics:

Variable	EPA Recommended Values	Model Installed at Colbert	Model Proposed for Colbert
		DataLynx Wind Sensor #220-100	DataLynx Wind Sensor #220-101
Horizontal Wind Speed	Starting Speed < or = 0.5 m/s; Dist. Constant < or = 5m	Starting Speed = 1 m/s; Dist. Constant = 2.7m	Starting Speed = 0.4 m/s; Dist. Constant = 2.7m
Wind Direction	Starting Speed < or = 0.5 m/s @ 10 deg deflction Damping Ratio 0.4 to 0.7; Delay Const. < or = 5m	Starting Speed = 0.9 m/s @ 10 deg deflction Damping Ratio 0.25; Delay Const. = 1.3 m	Starting Speed = 0.5 m/s @ 10 deg deflction Damping Ratio 0.45; Delay Const. = 1.2 m
		DataLynx Temp. Sensor #230-201	
Temperature	Time Constant < or = 1 min.	Time Constant: Instantaneous (4)	Existing Sensor

(1) As cited in "On-Site Meterological Program Guidance for Regualatory Modeling Applications" EPA 450/4-87-013
(2) Only horizontal wind speed will be monitored.
(3) Precipitation and Barometric Pressure are being collected for project purposes that do not require compliance with EPA meterological recommendations.
(4) The system will remain on continuously, because of this there will not be any warm-up time.



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LANDAU ASSOCIATES, INC.

Site Plan